DRAWING AMENDMENTS

Please replace the current Figures 1 and 3 (that were examined 6/14/2005) with the following Replacement Figures 1 and 3. These drawing figures have been amended at four locations to indicate "springs 74" at the lower ends of "internal ducts 52". An explanation of the changes is incorporated into the following Remarks section of this Reply. A marked up copy of current drawing Figures 1 and 3 indicating the changes is attached to this Reply as Appendix A.

REMARKS

Claims 1-9 were presented for examination on 4/1/2005.

The Office Action mailed 06/14/2005 states that:

(a) Claims 7 and 8 were withdrawn. See Paragraph 1 on Page 2 of the Office Action.

(b) The drawings were objected to under 37 CFR 1.84(p)(4) for the stated reason that reference characters 70 and 74 have been used to designate the same item. See Paragraph 3 on Page 3 of the Office Action.

(c) The drawings were objected to under 37CFR 1.83(a) for the stated reason that they do not show support springs 74 as described by Claims 2 and 3 and internal ducts seismically supported as described by Claim 4. See Paragraph 4 on Pages 3-4 of the Office Action.

(d) The specification was objected to under 35 USC 112, first paragraph, and Claims 1-6 and 9 were rejected under 35 USC 112, first paragraph, for the stated reason that the specification does not provide an adequate description or enabling disclosure of the support springs and seismic support structure. See Paragraphs 6 and 7 on Pages 5-6 of the Office Action.

(e) Claims 1-6 and 9 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as their invention. See Paragraph 8 on Pages 7-8 of the Office Action.

(f) Claims 1, 4, 6 and 9 were rejected under 35 USC 102(b) as being anticipated by US Patent No. 5,742,652 ("Hankinson"). See Paragraph 10 on Pages 8-12 of the Office Action.

(g) Claims 1, 4, 6 and 9 were rejected under 35 USC 102(b) as being anticipated by US Patent No. 4,678,623 ("Malandra et al."). See Paragraph 11 on Pages 12-14 of the Office Action.

(h) Claims 1, 4, 6 and 9 were rejected under 35 USC 103(a) as being unpatentable over Malandra et al. See Paragraph 13 on Pages 15-18 of the Office Action.

Claims 1-6 and 9 are presented for reconsideration. Claims 1, 2, 5 and 9 have been amended. Claims 7 and 8 have been withdrawn from active consideration. It is respectfully submitted in view of the above amendments and below remarks that these claims are unobjectionable and satisfy the requirements of the patent statute. Accordingly, their allowance is respectfully solicited.

RE: OBJECTIONS AND REJECTIONS UNDER
37 CFR 1.83 AND 1.84 AND 35 USC 112, FIRST & SECOND PARAGRAPHS

-A-

The Examiner pointed out that the drawings do not show the "resilent spring 74" described in the description at page 5, lines 10-12, as "a narrow deformed length of the internal duct 52" which supports the lower end 70 of the duct 52 against the coil stack assemblies 36.

Preliminarily, the Applicants note that patents are written to inform the ordinarily skilled workers in the pertinent art and are to be evaluated from this viewpoint. In the instant case, the ordinarily skilled workers are the engineers who design the appurtenant structures of nuclear reactor vessels. The skill and abilities of these designers is suggested by the attached article entitled "Integrated Head Assembly for Korean Next Generation Reactor" by Kim et al, Transactions of the 15th International Conference on Structural Mechanics in Reactor Technology, August 1999, which is attached as Appendix B.

These designers have for many years formed integral resilient springs by deforming narrow lengths of the structural parts to be stabilized. See, in this regard, US Patent No. 5,265,138 entitled "Spring/Dimple Instrument Tube Restraint" showing a spring 136 in Figure 6 and stating at Column 7, lines 13-21:

> "The springs 136 each are formed by two axial slits 138, with the web 140 between the slits 138 deformed radially inwardly to define a spring bow which is attached integrally to the tube section 132 at the ends of the slits 138. The slits 138 can be, for example, about 0.5inches long, and about 0.2 inches in width (1.2.times.0.5 cm). These dimensions can be varied as needed to provide a softer hold, e.g., by using axially longer and/or more closely spaced slits, or a stronger hold."

See, also, US Patent No. 4,923,669 entitled "Nuclear Fuel Rod Grid Spring And Dimple Structures Having Chamfered Edges For Reduced Pressure Drop" showing a spring 58 in Figures 8-12 and stating at Column 6, lines 53-68:

> "As seen in FIGS. 8-12, like each dimple structure 56, each fuel rod engaging spring structure 58 too is composed of resiliently yieldable flexible material of the inner straps 40, such as stainless steel or zircaloy metal. The components of the spring structure 58, which will be described next, are integrally formed, such as by conventional stamping and coining operation, from each wall section 52 of the inner straps 40 in association with each cell 46 of the grid 16. Also, each inner grid strap wall section 52 has a pair of cutout portions defining windows 68 at opposite sides of the spring structure 58. In a general overall sense, the spring structure 58 is formed to extend diagonally between the windows 68 of the respective wall section 52 and integrally connect at diagonally opposite upper and lower locations on upper and lower portions of the walls sections 52."

Such springs (when disposed within the reactor pressure vessels of operating pressurized nuclear reactors) inherently accommodate thermal expansion and differentials in thermal expansion when exposed to highly turbulent water circulating at temperatures between room temperature and about 560°F.

The Applicants have amended Figures 1 and 3 to show the lower ends of ducts 52 having deformed lengths or springs 74 (as recited by Claim 2) supported by adjacent coil stack assemblies 36 (as recited by Claim 3).

-B-

The Examiner stated the objection that the drawings do not show the ducts 52 being seismically supported by the seismic support platform 26 as recited by Claim 4. The Examiner also stated the view that there was not an enabling disclosure of how a CRDM, an internal duct or an internal seismic support structure (such as cruciform 76) transfers seismic loads to the seismic support platform.

The Applicants respectfully submit that Figures 1 and 2 show (to ordinarily skilled designers in the nuclear art) that the ducts 52 are seismically supported by the seismic support platform 26 and that they would be able to design and use such a structure in a seismic support system. See, in this regard, the prior art of record, including: Malandra et al., which discloses control rod drive mechanisms 116 and air ducts 140 supported by a seismic support platform 128; Hankinson et al., which shows a seismic support comprising spacer plates 70; and US Patent No. 6,546,066 (Baliga et al.), which shows in Figure 12 and discusses at Column 7, lines 15-33, a seismic support system 300 with seismic cap plates 310.

With regard to the internal support structure (cruciform 76) discussed in the description at page 5, lines 18-21, and shown in Figure 1 as disposed in the ducts 52 at the level of the seismic support platform 26, the Applicants submit that designers would understand that that the ducts 52, upper plenum 54 and cruciform 76 could be joined by any suitable means such as by welding

or with fasteners. For example, the preceding sentence of the specification at page 5, lines 16-17 states that the upper end of the duct 52 are supported by the upper plenum by "e.g., bolts extending through duct flanges (not shown)."

The Applicants also note that Figure 1 shows an embodiment of the present invention where the cruciform plates 76 have larger cross sections than do the internal ducts 52. In this design, the lower ends 70 and upper ends 72 of the ducts 52 may be comprised of two lengths like the design discussed by Malandra et al. at Column 7, lines 10-25. In this design the cruciform plates may cooperate with the seismic support platform similar to the above-mentioned Malandra et al., Hankinson et al. and Baliga et al. designs.

-C-

The Examiner stated that:

--Claim 9 is vague, indefinite and incomplete as to what all is meant and encompassed by the phrase "whereby, when the upper leg member is detached from the lower leg member, the upper plenum and the fan assembly disposed on the upper plenum and the missile shield assembly may be removed as a subassembly from above the RPV." This limitation is poorly phrased in that in one interpretation of the claim language ONLY the upper plenum and the fan assembly are removed as a subassembly since the fan assembly is disposed on the upper plenum and the missile shield assembly, and in another interpretation the upper plenum, fan assembly and missile shield may be removed as one complete subassembly from above the RPV.--

Accordingly, the Applicants have deleted the term "subassembly" and have amended Claim 9 to more clearly indicate that structure supported by the upper leg member may be removed separately from the closure head (when the upper leg is detached from the lower leg) or as an integral unit with the closure head and seismic support (when the upper leg is attached to the lower leg). In addition: Claims 1 and 9 have been amended by replacing the abbreviations such as CRDM and RPV with the full names.

The Applicants respectfully submit that the presented claims of invention are unobjectionable and satisfy the requirements of 35 USC 112, first and second paragraphs, and the requirements of 37 CFR 1.83 and 1.84.

RE: REJECTIONS UNDER 35 USC 102(b) AND 103(a)

-A-

Preliminarily the Applicants note that there are no prior art-based rejections of Claims 2, 3 and 5. Therefore, the Applicants have rewritten Claims 2 and 5 in independent form.

Accordingly, the Applicants respectfully submit that Claims 2, 3 and 5 are allowable at this time.

-B-

The Examiner stated the position that Claims 1, 4, 6 and 9 are anticipated by Hankinson et al.

In analyzing Claim 1, the Examiner stated that the "plurality of internal ducts" of Claim 1 reads on Hankinson et al.'s baffle 58 or (alternatively) a RPI coil element 56.

It is respectfully submitted that Hankinson et al.'s baffle 58 is not an internal baffle but rather an external structure corresponding to the Applicants' lower shroud 50 that surrounds all of the magnetic coils associated with the control rod drive mechanisms. See, in this regard, Hankinson et al. at Column 4, lines 27-31, which states that "an air flow baffle 58 ... surrounds the electromagnetic coils 54 of all of the CRDMs 22."

Claim 1 has been amended to recite that the lower ends of the internal ducts are disposed below the upper end of the lower shroud. This structure is shown in Figure 1. Neither Hankinson et al.'s baffle 58 nor coil element 56 discloses or suggests this structure.

Regarding Claim 6, the Applicants respectfully submit that Hankinson et al. does not teach or suggest a structure wherein the upper fan plenum 28 supports internal air ducts that extends into the lower shroud.

Regarding Claim 9, the Applicants respectfully submit that Hankinson et al. does not teach or suggest an arrangement wherein a lift leg comprises an upper leg (supporting recited structure) "detachably connected" with a lower leg (supporting recited structure) for removing the structure supported by the upper leg separately from the structure supported by the lower leg or removing the structures as an integral assembly. Rather, Hankinson's Item 46 shown in Figure 2 is a lift rig, which in normal operation is intended to lift the integral head assembly.

Accordingly, the Applicants respectfully submit that Hankinson et al. does not teach or suggest the use of internal ducts of Claims 1, 4, 6 and 9 for circulating cooling air through the integrated head.

-C-

The Examiner stated the position that Claims 1, 4, 6 and 9 are anticipated by Malandra et al.

In analyzing Claim 1, the Examiner read the "internal ducts" of Claim 1 on Malandra et al.'s external ducts 136 for the stated reason that "the claims fails to define the outer boundaries of the array". Also, the Examiner read the array as extending to the outer circumference of the lower air manifold 120 (which corresponds to Applicants' CRDM plenum 62).

Claim 1 has been amended to recite that the internal ducts are "disposed between control rod drive mechanisms within the array". It is respectfully submitted that Malandra et al. does not disclose or suggest this structure.

Accordingly, the Applicants respectfully submit that Malandra et al. does not teach or suggest the use of internal ducts of Claims 1, 4, 6 and 9 for circulating cooling air through the integrated head.

-D-

The Examiner stated the position that Claims 1, 4, 6 and 9 are unpatentable in view of Malandra et al.

In analyzing Claim 1, the Examiner stated that it would have been obvious to relocate the air ducts from the periphery of the CRDMs (Malandra et al.'s design) to the internal spaces within the CRDMs (Applicants' design).

The Applicants respectfully submit that the use of internal ducts was not an obvious improvement because their presence in the array and a 180° air flow reversal create a different air flow pattern.

Accordingly, the Applicants' respectfully submit that Malandra et al. and the other art of record does not (inherently or otherwise) disclose or suggest the improvements of Claims 1, 4, 6 and 9.

The Commissioner is authorized to charge any additional fees required by 37 CFR 1.16 or 37 CFR 1.17 as a result of this Reply to Deposit Account No. 50-0947.

Respectfully submitted,

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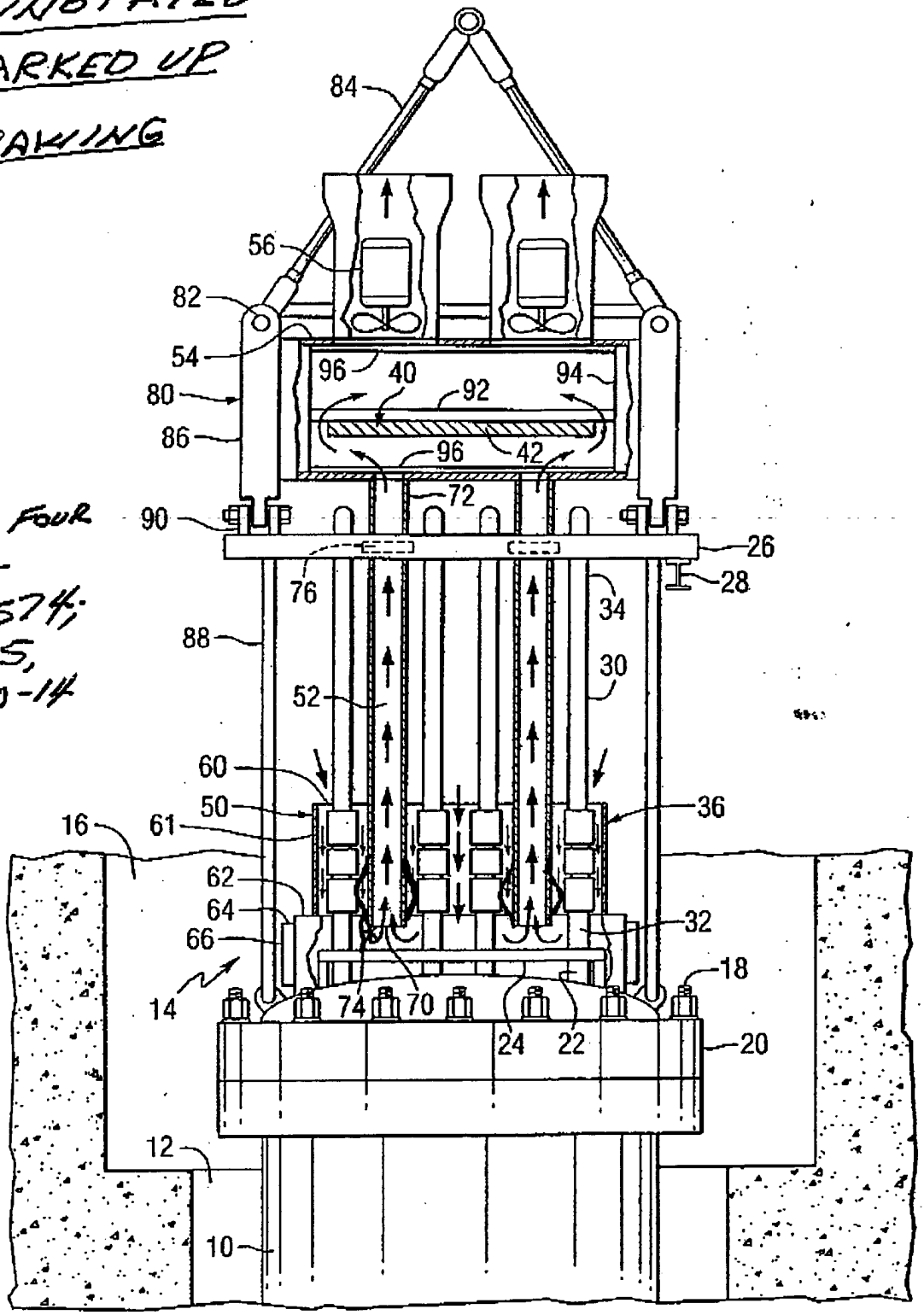
Date: 10/11/2005

J.C. Valentine:pl
Reg. No. 27,239

ANNOTATED MARKED UP DRAWING

1/3

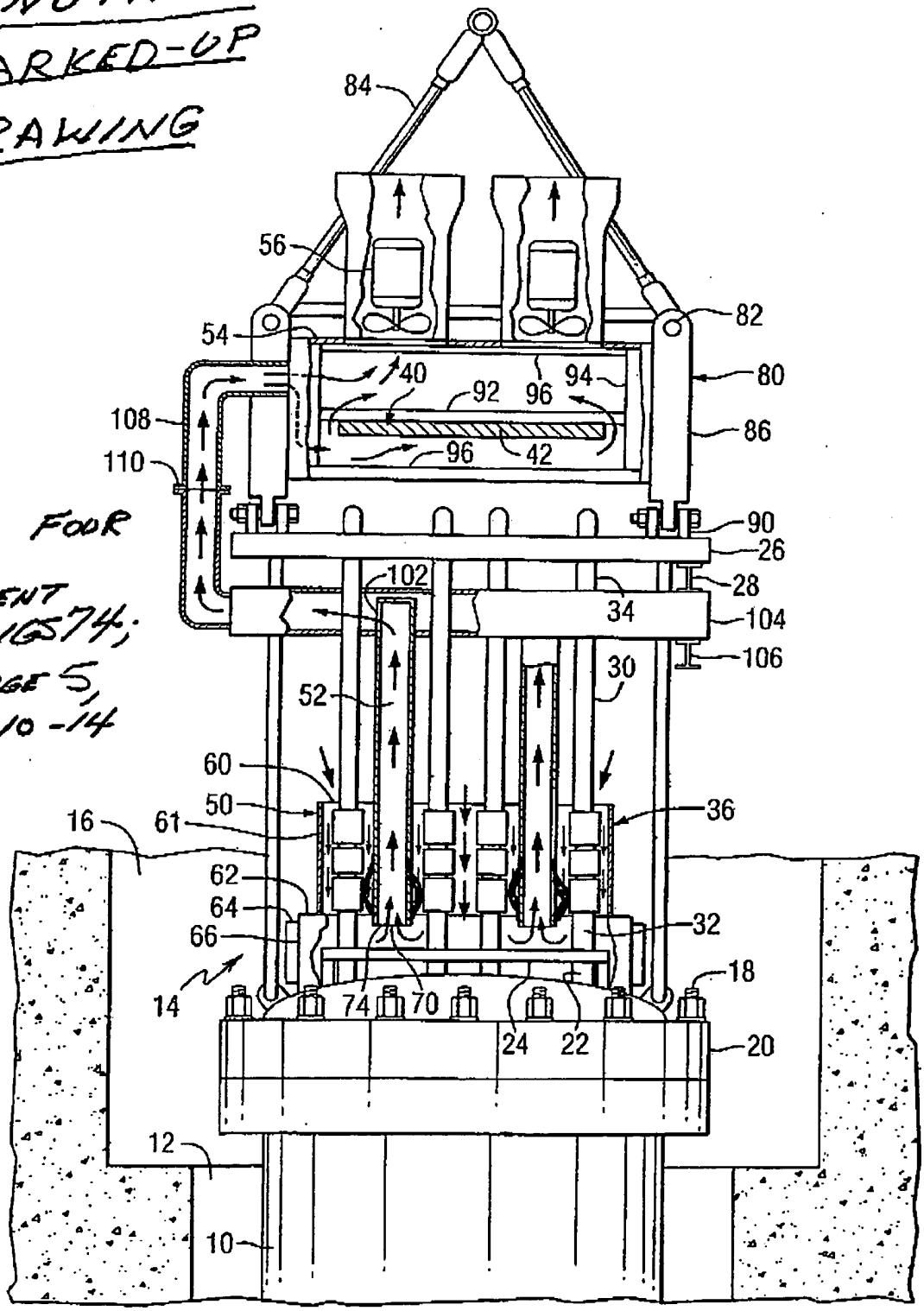


ADDED FOUR RESILIENT SPRINGS 74; SEE PAGE 5, LINES 10-14

FIG. 1

APPENDIX A

ANNOTATED MARKED-UP DRAWING



ADDED FOUR RESILIENT SPRINGS 74; SEE PAGE 5, LINES 10-14

FIG. 4

APPENDIX A